CORONA

NRO review(s) completed.

Launch to Orbit Injection: The Agena vehicle has been designed for use with both THOR and ATLAS boosters. In either combination the ascent technique used by Agena vehicle is substantially the same; however, there are significant diffs in the method of utilizing booster. In COR in order to consierve weight, Thor booster foolows a preprogrammed trajectory using only its ~~az~~ autopilot. Further Thor thrust is not cut off by command at pre determined velocity but fuel burns to near exhaustion. This relatively inaccurate booster performance compared to Atlas booster for Agena, and coupled with lower altitude of COR orbits, imposes severe orbital injection rqmts. Specifically these rqmts are such at at an injection altitude of 120 statute miles (typical) an angular error of plus or minus 1.1 degrees or a velocity deficity of only 100 feet per second below the value for a circular orbit will result in a failure to complete the first orbit. To insure an optimum payload weight in relation to high probability of achieving orbital injection, the COR program successfully undertook a re exploration of the problem of rocket engine performance prediction for the Agena engine. This study led to new theories and the improvement of existing ones to assist in determination of sea level engine performance; methods of extrapolation to vacuum performance; degree of anticipated performance deviation in flights; vehicle propellant loading and weighing techniques; and determination of the proper level of conservatism in flt performance prediction.

Outgrowth of this effort improved performance prediction and based on numerous simulated altitude firings at Bell and ARDC, a revision in the method of estimating vacuum engine performance from ground tests. This effort is responsible for resolution of a problem area that could have plagued both SAMOS and MIDAS wit failures to orbit.

As result of CORONA developments, it has been possible to repeatedly inject CORONA vehicles into orbit with an injection angle error not exceeding 0.4 degrees.